CRESOTE—ITS TESTS AND ACTION.*

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I HAVE previously written on the curative value of creosote and the preparation of creosote pills. Now that we are able to procure and dispense genuine creosote from beechwood tar, I take the liberty of again treating the subject from a therapeutical and chemical point of view.

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Camboulives, a French physician, warns us in his *Manuel Pratique de la Therapeutique* to distinguish well between creosote and phenol (carbolic acid), as the former from beechwood tar was destined to play a great part in therapeutics owing to its powerful action. More than this; it coagulates albumen, has the property of preserving animal substances for a long time, and being antiseptic, anatomical preparations can be kept in a lasting state of preservation.

But creosote has other virtues, owing to its causticity and astringent power. When put in contact with the skin it produces wounds that are similar to burns and pain like them. On account of its corrosive power it is much used to kill the tooth nerve in toothache. When diluted it is no longer caustic, but becomes astringent. Taken inwardly in moderate doses it develops a feeling of warmth in the stomach with sour eructations, &c. When it has passed into the blood circulation it tightens the capillaries, and decreases the mucous flow both in the bladder and the air passages.

Camboulives remarks further: "This medicament has enjoyed an undeserved reputation since its discovery, for people were soon convinced that it was only useful for carious teeth and toothache." Nevertheless, Bouchard and Gimbert endeavoured to restore its reputation as a curative agent, and they administered it in pulmonary consumption, &c. Their experiments were successful, and they have published a long list of their observations, to the effect that creosote after being administered for a week or two has the effect of decreasing the expectoration, lessening the cough, increasing the appetite, removing the fever, increasing the strength, and almost suppressing night sweats, while it gives an *embonpoint* such as the patient had only in his healthy days. The abnormal noise heard in the breast of the consumptive ceases and is replaced by a healthy respiration, or at least is smoother in sound owing to the cicatrization of the diseased pulmonary tissue. The improvement in condition may continue for months, provided that the cure is not interrupted too soon. These physicians observed that the symptoms of the disease recur as soon as the use of the creosote is neglected, in the opinion that the lungs are healed.

From these statements it will be seen that Camboulives and many others did not believe in this beneficent action of creosote. They used it without obtaining the desired results. But creosote is a medicament that comes into the market of various degrees of quality, and if the apothecary does not dispense the genuine beechwood tar creosote—*Kreosotum faginem*—the expected results cannot be had.

To ascertain how justified was this unequalled action of creosote, I made use of it in several cases, and I found that consumptives, and sufferers from chronic catarrh visibly improved, and in one instance its use had to be stopped because the *embonpoint* of the patient who had lost flesh considerably, had so increased that new and large clothes had to be obtained. The results obtained by Bouchard and Gimbert have been fully confirmed by my experience, but, of course, only where genuine creosote is employed.

Among the curative qualities of creosote must also be reckoned its anti-asthmatic action. A railway employe who suffered from *asthma spasticum* and who derived some relief from the usual remedies without getting rid of the attacks, had only two attacks after taking the creosote pills. These, however, were mild, and they then ceased altogether. As a precautionary measure, however, he continues, to take the pills every other day.

As creosote made from beech tar is one of the grandest remedies for keeping up

consumptives and those suffering from bronchial diseases, for increasing the flesh of the emaciated, removing asthma, and perhaps bringing tuberculosis to a standstill in its early stages, as well as relieving kidney diseases and destroying the vitality of intestinal worms, it is the incumbent duty of the apothecary to dispense only the genuine and to convince himself of its quality. We shall explain the marks of genuine creosote and the sources from which it can be had.

In a case before me are phenols and creosotes, as follows:

1. Colourless Kreosotum.
2. Colourless Kreosotum album verum.
3. Yellow Kreosotum Anglicum.
4. Brownish Yellow Kreosotum Faginum.
5. Chemically pure Ph. G. Kreosotum from beechwood tar (Kreosot Hannoveranum) yellowish.
6. Kreosotum Saginum (A) yellow.
7. ,, ,, (B) yellow.
8. ,, ,, (C) brown.

Out of these eight kinds only Nos. 4 and 5 proved to be genuine; No. 8 was genuine but very dirty.

1. Pure creosote made from beechwood tar is insoluble in double its volume of anhydrous glycerine, while other creosotes are completely soluble, or give a perfectly limpid mixture. When the mixture is milky or whitish with double the volume of anhydrous glycerine, the creosote is presumably pure, but if coloured (No. 8 was of a muddy red) then the creosote is not genuine.

Phenol is not an adulterating agent in every case; there are others which are not soluble in glycerine, and least of all in a solution of 75 per cent. of glycerine (as for instance creosol or creosylalcohol).

Nos. 1, 2, 3, 6 and 7, when mixed with a double volume of anhydrous glycerine gave clear liquids. Mixtures of $\frac{1}{4}$ to $\frac{1}{3}$ of creosote and $\frac{3}{4}$ to $\frac{2}{3}$ of phenol with glycerine under the same conditions give clear liquids.

2. To observe the action of the phenol, we mix three volumes of glycerine (75 per cent.) with one volume of the suspected creosote and shake well. Two layers will be formed when the mixture settles; one will be very muddy; the other somewhat less so.

The volume by which the last layer has been decreased is approximately that of the phenol present; in order to ascertain it definitely we must increase the layer of the 75 per cent. glycerine by an equal quantity of the same glycerine and shake the whole well. The phenol passes into the glycerine up to 98 per cent.; or we can shake up the creosote with 5 per cent. of caustic ammonia, which dissolves phenol but not creosote from beech tar.

Graetzel and the writer both observed that creosote when agitated with glycerine almost doubled its volume. But, with an undoubtedly genuine specimen before us, we cannot obtain this increase of volume, and this change cannot therefore be regarded as an indispensable mark of beech tar creosote.

These two tests (1 and 2) with anhydrous and 75 per cent. glycerine indicate whether we have genuine creosote, but two reactions are yet required to fully prove it. 3. Equal volumes of creosote and soda lye (of 1·334 specific gravity) are mixed together to ascertain

the wood tar particles. With a very slight degree of heat development there is a clear yellow solution. If the mixture is not clear and transparent, or has another colour, or when it stiffens to a non-liquid mass, the creosote is not pure, if it be present at all. No. 1 gave a muddy whitish, and No. 8 a grayish brown mixture, which thickened after the lapse of half an hour. The remaining non-creosote specimens gave light lemon, dark lemon, or brownish yellow mixtures. No. 4 gave a red mixture, and contained 9 per cent. of non-creosote matters.

The new German *Pharmacopœia* gives a variation of this lye reaction. The soda lye of 460 specific gravity and creosote mixed by equal parts of weight should give a clear liquid (it may be yellow), but must not be dark coloured or throw off bad-smelling tar when diluted with water. According to this test, three kinds of non-creosotes, Nos. 1, 2, and 3, genuine creosotes, and only No. 8 gave a dark coloured muddy mixture. Testing with a soda lye of 1·334 specific gravity is therefore to be preferred. 4. Beech tar creosote gives a clear solution in petroleum benzine. A mixture of 1 volume creosote and 2 volumes of benzine is almost colourless or yellowish, but perfectly clear. Neither phenol nor cresol are soluble in benzine, and creosote gives a rather muddy mixture with even 5 per cent. of this phenol, which, after settling an hour, separates into two layers. This benzine solution, when transparent, is divided into three portions. The first is decomposed by an equal volume of caustic ammonia; the second by a lye of caustic soda of 1·160 specific gravity, and both parts are well shaken. No dark colouring, dark brown, or cinnamon should show itself in the course of half an hour. The third portion is (according to Hartmann and Hauers) mixed and shaken up with an equal volume of caustic baryta water. In this case neither blue, violet, nor red colour should appear. It is immaterial in what layer, the aqueous or the oily, the colouration is; they indicate tar components which should not be present.

5. Mix 1 volume of creosote and 2 volumes of a 15 to 18 per cent. caustic ammonia, shake well, and put aside. The genuine clear creosote will, in the course of half an hour, be coloured almost a lemon shade, and an aqueous layer on top will be yellow gray or some pale colour. A dark colour indicates foreign bodies, and if the volume of the creosote has diminished it contains phenol, cresol, or kindred matters that do not belong, however, to creosote. The test can be made with even a 10 per cent. caustic ammonia, but a double volume is then requisite.

6. Equal volumes of collodium and creosote should not form into a jelly, but should rather become a liquid mass after half an hour; in the contrary case more or less phenol is present.

The first three or five tests are sufficient for true creosote, so that the other reactions may be dispensed with.

A creosote that does not comport itself as such should not be used, at least inwardly. Some of the kinds may be admitted for external veterinary use, but must not be classed as genuine.

Doses should be as small as possible, but often repeated. Proper doses for an adult are 0·02 to 0·03 and 0·04 two or three times daily. The maximum single dose is 0·05, and the maximum for a day 0·2. The pilulæ Kreosotatæ contain 0·0167 g. in each pill (Ph. Centralh. 1881). Consumptives in the last stage may take two or three of these pills two or three times a day, according to bodily size, and if they feel tolerably well after some days'

use, they should take two or three pills uninterruptedly night and morning, dropping them, perhaps, one or two days a week.

Pure creosote is pale yellowish, exudes oil, and is of 1·06 specific gravity. The gravity should be fixed at 1·050 to 1·080, as the lighter creosotes were either impure or not properly such.

Creosote is best administered in pills. The pilular mass is made by melting together 2 parts of yellow wax and 1 part of creosote, to which other suitable ingredients are added in form of powder, as quinine salts, salicylic acid, bals. solution, rad. gent., &c. Any addition of ether or spirits of wine, to give consistency to the mass, should be avoided, and is not necessary.

A lukewarm mixture of 7·3 creosote and 15·0 cera flava can, however, be mixed with 40·0 or 45·0 of the powder, so as to form a good pilular mass.